PRE-APPEAL BRIEF REQUEST FOR REVIEW

Docket Number (Optional)
42390P8657

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Signature: Theresa Belland

Typed or printed name: Theresa Belland

Application No.	Filed
09/676,556	September 30, 2000

First Named Inventor: Yen-Kuang Chen

Art Unit	Examiner
2193	Chat C. Do

Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request.

This request is being filed with a Notice of Appeal.

The review is requested for the reason(s) stated on the attached sheet(s).
NOTE: No more than five (5) pages may be provided.

I am the:

- ☐ applicant/inventor.
- ☐ assignee of record of the entire interest. See 37 CFR 3.71. Statement under of 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96)
- ☒ Attorney or agent of record. Registration Number 54,962
- ☐ attorney or agent acting under 37 CFR 1.34. Registration number if acting under 37 CFR 1.34 _____

Signature

Vincent H. Anderson
Typed or printed name

(503) 439-8778
Telephone Number

October 19, 2006
Date

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required.

☐ *Total of _____ forms are submitted.

PRE-APPEAL BRIEF REQUEST FOR REVIEW

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: **Yen-Kuang Chen et al.**	Examiner: Chat C. Do
Application No: 09/676,556	Art Unit: 2193
Filed: September 30, 2000	
For: AN EFFICIENT IMPLEMENTATION OF N-POINT DCT, N-POINT IDCT, SA-DCT, AND SA-IDCT ALGORITHMS	

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

In response to the Final Office Action mailed August 16, 2006, and in conjunction with the Notice of Appeal filed concurrently herewith, Applicants respectfully request review of the Final rejection of the claims of the above referenced application in view of the following.

Claims 29, 34, and 39 are the independent claims pending in the above-referenced patent application, and are the subject of this Request. In the Final Office Action mailed August 16, 2006, these claims were rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter, and under 35 U.S.C. § 103(a) as being unpatentable over the publication "A New Flexible Architecture for Variable Length DC Targeting Shape-Adaptive Transform" of Thuyen Le et al. (hereinafter "Thuyen Le") in view of U.S. Patent No. 6,687,724 of Mogi et al. (hereinafter "Mogi"). Each rejection will be addressed in turn.

Regarding the rejections under 35 U.S.C. § 101, the Office Action alleges at page 2 that the claims are directed to a mathematical algorithm. The Office Action at page 6 further asserts that the invention as recited in the independent claims do not provide "any practical application, which is a concrete, useful, and tangible result." Applicants traverse. As recited in the specific claim language, the claim recites "receiving a multimedia signal having data values," and performs various operations "to obtain a matrix of outputs [Y]." Applicants note that as per MPEP § 2106 IV.b.2(b)(i), a process represents statutory subject matter when the

> process . . . that requires the measurements of physical objects or activities to be transformed outside of the computer into computer data where the data comprises signals corresponding to physical objects or activities external to the computer system, and where the process causes a physical transformation of the signals which are intangible representations of the physical objects or activities.

The claimed invention recites the receipt of a multimedia signal, which represents a measurement of physical objects or activities outside of the computer. The measurements are transformed into computer data and operated on to obtain a matrix of outputs [Y], which is a transformation of the representative signal. Therefore, the method recited in the independent claims is a statutory process.

The claim language of claim 29 is representative of the independent claims, which recites:

> **receiving a multimedia signal having data values**;
> forming the data values into a matrix of inputs [X];
> forming a matrix [A] of predetermined values and multiplication operations;
> factoring [A] into a butterfly matrix [B], a shuffle matrix [S], and a multiplication matrix [M], wherein the multiplication operations are selectively positioned into pairs within [M]; and
> executing a Single Instruction Multiple Data (SIMD) instruction that multiplies [X], [B], [S], and [M] together **to obtain a matrix of outputs [Y]**.

In addition to the claim language, several practical applications for the process are provided in the description of the invention, which would be understood by one skilled in the art. Thus, as per MPEP § 2106 IV.B.2(b), a practical application in the technological arts is disclosed in the specification such that it would be known to a skilled artisan. Applicants therefore submit that the rejection of the claims under 35 U.S.C. § 101 is improper and respectfully request that this rejection be withdrawn.

Regarding the rejections under 35 U.S.C. § 103, the Office Action maintains this rejection of the claims under an interpretation of the cited references that is not supported by the cited references, and which further render the teachings of the cited references unsuitable for their design. As mentioned above, the claim language of claim 29 is representative for the independent claims, and recites "factoring [A] into a butterfly matrix [B], a shuffle matrix [S], and a multiplication matrix [M]...." The form and operation of each is clearly set forth in the Specification. Furthermore, the matrices are named according to their understood meaning by those of skill in the art. The Office Action continues to rely on Thuyen Le as disclosing a butterfly matrix; and specifically points to page 1950 of the cited reference, where a matrix [F] is disclosed. Applicants repeat here what has been previously presented as to why Thuyen Le does not support an interpretation of the [F] matrix as a butterfly matrix. A butterfly matrix performs a butterfly operation on a set of given input. An example of a butterfly operation takes two inputs (x_0, x_1) and yields two outputs (y_0, y_1), where $y_0 = x_0 + x_1$ and $y_1 = x_0 - x_1$. Thus the 2x2 butterfly matrix is

$$\begin{bmatrix} 1 & 1 \\ 1 & -1 \end{bmatrix}$$

because

$$\begin{bmatrix} x_0 + x_1 \\ x_0 - x_1 \end{bmatrix} = \begin{bmatrix} 1 & 1 \\ 1 & -1 \end{bmatrix} \begin{bmatrix} x_0 \\ x_1 \end{bmatrix}.$$

The operation can be drawn as

$$\begin{bmatrix} x_0 & & y_0 \\ & & \\ x_1 & -1 & y_1 \end{bmatrix}.$$

Similarly, examples of 3x3 and 4x4 butterfly matrices are

$$\begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & -1 \end{bmatrix} \text{ and } \begin{bmatrix} 1 & 0 & 0 & 1 \\ 0 & 1 & 1 & 0 \\ 0 & 1 & -1 & 0 \\ 1 & 0 & 0 & -1 \end{bmatrix},$$

respectively. As Applicants have understood the reference, matrix [F] fails to perform a butterfly operation. Thuyen Le states that the assignment of γ in [F] is arbitrary. The assignment of γ is arbitrary in that "the assignment of γ's to columns [within the [F]] is arbitrary," page 1951, col. 2. However, as described in col. 1 of page 1950, γ is defined as $\gamma(n) = \cos(n\pi)$. Whether γ is limited to this definition, or another is applied, Applicants note that **no γ can be applied to allow [F] to perform a butterfly operation**. Furthermore, Applicants respectfully point out that butterfly matrices are square matrices. [F] is a 10x4 matrix, which is not a square matrix. In response to Applicants' contention in Applicants' previous Response that [F] is not a square matrix and thus cannot possibly be a butterfly matrix, the Response to Arguments on pages 6 to 7 of the Final Office Action asserts that a matrix C_{NxN} also disclosed in Thuyen Le is a square matrix. Applicants point out that the matrix C_{NxN} is **not** the matrix [F]. Thus, it is immaterial what form the matrix [C] has, because the Office Action asserts that the matrix [F] discloses the butterfly matrix. Such an argument causes Applicants to question the basis upon which the rejection of the claims under the cited references is based. Is the butterfly matrix purportedly disclosed by the [F] matrix, as the previous Office Actions have stated, and as the Final Office Action appears on its face to do, or is the butterfly matrix purportedly disclosed by the [C] matrix, which argument the Final Office Action introduces for the first time, and fails to develop? Any line of reasoning that contends that because the different matrix [C] is square, it means that the non-square matrix [F] now discloses a butterfly matrix is nonsensical. Additionally, there is no basis in the cited reference to support an interpretation that the [C] matrix is a butterfly matrix.

Furthermore, as mentioned above, an interpretation of [F] as a butterfly matrix would render the teachings of the cited reference inoperable. As described in col. 1 of page 1950, the form (i.e., 10x4) of [F] was selected to select the correct elements in $[d]_N$ for multiplication. One skilled in the art would appreciate that changing the form/dimensions of a matrix in a matrix computation would affect the output of the computation. Thus, equation (2) of the cited reference

would not yield the sought-after result, if [F] were a butterfly matrix. Therefore, the teachings of the cited reference are contrary to the interpretation proffered in the Final Office Action.

The Thuyen Le reference fails to disclose or suggest factoring a matrix into a butterfly matrix [B], a shuffle matrix [S], and a multiplication matrix [M], as recited in Applicants' claims. Furthermore, the Mogi reference fails to cure the deficiencies of Thuyen Le. Whether or not Mogi discloses the use of SIMD instruction, the reference suffers at least the same defect as Thuyen Le, and fails to disclose at least factoring a matrix into a butterfly matrix [B], a shuffle matrix [S], and a multiplication matrix [M]. Thus, whether alone or in combination, the cited references fail to disclose or suggest the invention as recited in the independent claims, and the Final Office Action fails to provide a proper rejection of the claims. The dependent claims are allowable over the cited references for at least the same reasons as the independent claims.

Applicants thus submit that the Final rejection of the claimed invention is improper, and respectfully request that the rejection be withdrawn.

Respectfully submitted,
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN, LLP

Date: October 19, 2006

Vincent H. Anderson, Reg. No. 54,962
12400 Wilshire Blvd.
Seventh Floor
Los Angeles, CA 90025-1026
Telephone: (503) 439-8778

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Signature: _____ 10/19/06
Theresa Belland Date